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POWER

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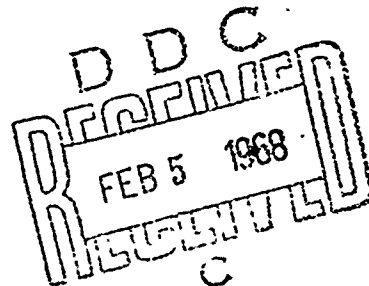
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## Mine-Torpedo Weapons During The Years of Soviet Power

by Vice Admiral B. D. KOSTYGOV

Russia is the birthplace of mine-torpedo weapons. Lieutenant Colonel I. I. FITSUM, an instructor in the Naval Cadet Corps, built the first powder bottom mine in the world in 1807. Over the next 40 years, the efforts of the talented Russian scientists P. L. Shilling, B. S. Yakob', P. L. Chebyshev, and E. Kh. Lents, resulted in the creation of galvanic and horned mines. The torpedo is junior to the mine, since it was developed in the 1860s by the talented inventor I. F. Aleksandrovskiy.

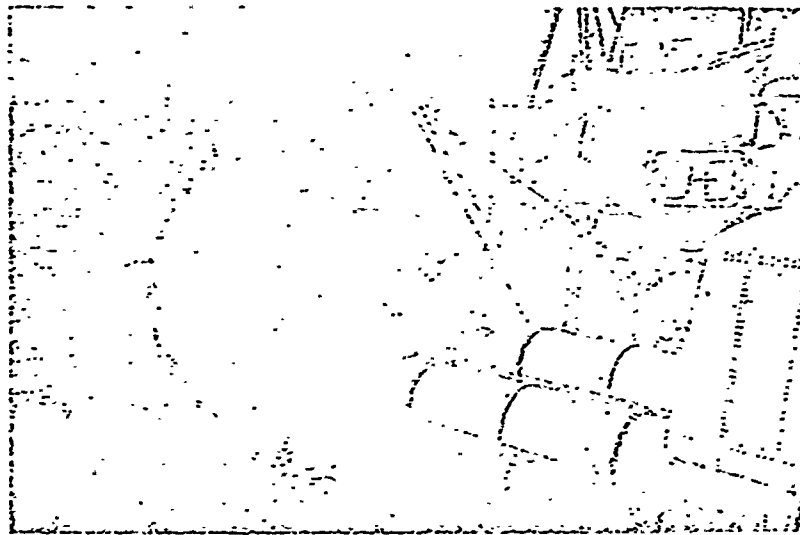
Russian scientists made constant improvements in the mines and torpedoes, while the sailors constantly increased their mastery in using them in battle.

The men of the Soviet Navy have inherited the rich experience, and the best traditions, of the Russian fleet in the development and use of mine-torpedo weapons. The fleet of the young Republic of the Soviets actively used mines in the struggle with the White Guards and the interventionists during the years of the Civil War. On personal instructions from V. I. Lenin, the revolutionary Baltic sailors laid approximately 1500 mines in the approaches to Kronshtadt and Petrograd between 10 and 14 August 1918. In 1919, upon the recommendation of S. M. Kirov, mines were used to close the approaches to Astrakhan. Red Navymen successfully used mines against the interventionists in the Sea of Azov, and along the Volga, Kama, Pripyat, and other rivers. Some 8,000 mines in all were laid in the maritime and river theatres during the years of the Civil War.

After the conclusion of the Civil War, the young Republic of the Soviets set about the construction of regular armed forces.

In those first years the arsenals of the warships included the mines and torpedoes remaining from the old Russian fleet. The best of them were the 45-cm torpedo, which had a speed of 39 knots and a range of 3,000 meters, and the shipboard, moored, mechanical mine containing a 116-kg charge of TNT.

A weapon such as this could hardly satisfy the fleet of the first socialist state in the world. Yet, in order to create a new weapon one required the building of specialized industrial enterprises, the establishment of design and scientific-research institutions, and the return to normalcy in the training of engineering-technical and scientific cadres.



Torpedoes on their way to the target.

Solutions to these problems were made more difficult by the ruin which pervaded the country's national economy.

Never the less, since the interests of protecting the achievements of October demanded the strengthening of defensive power, the Party and the government concentrated special attention on the quickest possible development of those branches of the national economy which were of decisive importance in strengthening the military might and increasing the economic stability of the Soviet state. Plans called for the creation of a powerful defense industry, capable of producing all types of combat equipment and armaments, the basis for which was the widespread industrialization of the country. Simultaneously, the network of scientific-research institutions, planning organizations, and special schools was expanded.

Upon the decision of the Soviet government in 1921, the Special Technical Bureau (Ostekhbyuro), charged with the development of naval weapons, including mine-torpedo weapons, was established. In 1922 the Naval Academy began to train highly qualified specialists for the mine-torpedo specialty, and in 1933, so too did the other higher naval schools. The Naval Mine Range was created in 1924, for testing the new models. The decrees of the Committee of Defense, envisioning the strengthening of the industrial and scientific-technical base, issued in 1937, 1938, and 1940, were of particularly great significance in the development of mine-torpedo weapons.

All of this made it possible to build a mine-torpedo industry virtually

from the bottom up in a short period of time, as well as the specialized scientific-research and design organizations needed so the industry could operate successfully.

At the same time, during the first years of the molding of Soviet power, the level of the industrial base was such that it was difficult to ensure the production of just pre-revolutionary, pretty much obsolete, models of mines and torpedoes.

This, naturally, limited the capability for carrying out combat missions and gave rise to the "small war" theory, according to which, in particular, planned destruction of the enemy's main naval forces rested on mine-artillery positions, prepared in advance. Hence, no such requirements as a high capability for being constantly ready for action over an extended period of time were imposed on mine-torpedo weapons.

Since the main naval might abroad consisted of large surface warships, mine-torpedo weapons developed primarily along lines which took into consideration the mission of destroying just such enemy forces.

Therefore, one of the trends in the development of weapons was that of increasing the weight of the charge and using more powerful explosives. Intensification of counterfire from the surface warships against the attacking ships carrying the torpedoes required that the range at which the torpedoes were fired be increased, and this, in turn, brought with it a need to make torpedoes with a range in excess of the effective range at which anti-mine artillery could be fired.

Thanks to the way in which the decisions made by the government were carried out, each following upon the other, the mine-torpedo industry was able to produce what were, at the time, the 1940s, modern mines and torpedoes. Thus, added to the VMF arsenal at the time was a torpedo with a range of 10-km, carrying a charge of 300-kg of TNT, as well as a large, shipboard, moored, horn mine with a charge of 230-kg of TNT which exploded upon direct contact with the hull of a ship.

The warships began the transition from aimed fire to zone fire in order to provide a high probability of the torpedo hitting when fired at long range.

Yu. A. Dobrotvorskiy, L. G. Goncharov, and B. A. Denisov made great contributions to improving the methods involved in the combat utilization of underwater naval weapons. The work they did made it possible to develop

tactics whereby all carriers of torpedoes and mines could use them.

Primary carriers of mine-torpedo weapons in the pre-war period were considered to be submarines, surface warships, and aviation. The capability for closing the target under attack quickly pushed aviation into becoming one of the active types of forces in actions against surface warships and cargo ships of an enemy, as well as in carrying out active mining operations.

Whereas surface forces and aviation in the pre-war years were readied primarily in the coastal regions in mine-artillery positions, submarines, with their considerably greater combat capabilities, could be used not only for coastal defense, but also at long distances from the coast.

The capability of secretly inflicting torpedo strikes and for mining enemy waters, as well as laying mines along the routes used by enemy navigation, were the acknowledged advantages of the submarines which predetermined the particular attention given to their construction.

However, the gas-steam torpedo included in the arsenal left a track and often disclosed the whereabouts of the submarine. So long before the war work began on the design of a wakeless torpedo. The electric torpedo, use of which was particularly successful by the Northern Fleet during the Great Patriotic War, made its appearance in 1942. The group holding the patent, headed by Chief Designer N. N. Shamarin, was awarded a State Prize for creating the electric torpedo.

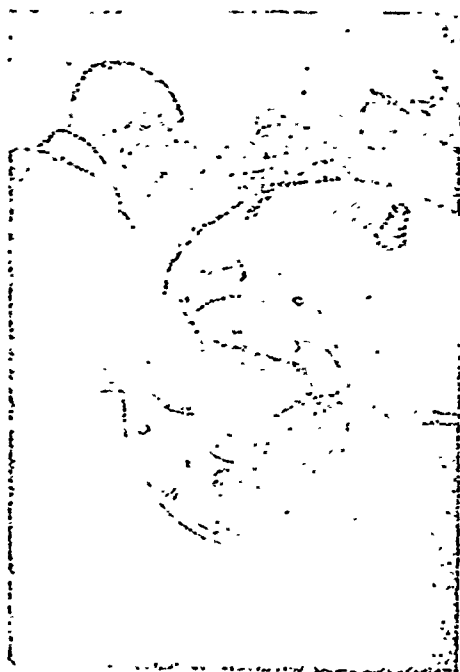
The experience of World War I had shown that some of the torpedoes launched against targets passed under them harmlessly, the result of incorrect determinations of the drafts of the target ships. The designers were thus faced with the task of developing influence exploders which would make certain the torpedoes would explode under such conditions and increase their destructive effects. This task was carried out successfully in 1941.

Soviet influence mines were developed immediately after the October Revolution. However, prior to 1927, this development was, in the main, limited to laboratory research, to the study of the physical fields of warships, and to the development of the principal circuits for induction, magnetic, hydrodynamic, and acoustic exploders. The first influence mines for use from surface warships were added to the arsenal in 1939.

A great contribution to the successful development of naval underwater weapons was made by famous Soviet scientists, including academicians, cor-

responding members of the Academy of Sciences of the USSR, doctors and candidates of sciences, naval officers, famous specialists and inventors in the field of instruments for naval ship navigation and armaments.

The instruments used in controlling the torpedo's course were improved in order to increase the probability that the torpedo would hit its target, and guidance systems were developed. In 1936, a course instrument was made which provided for stable movement of the torpedo over its course at long range and with a high degree of accuracy. The work which had started on a guidance system for the gas-steam torpedo was interrupted by the war and was not taken up again until 1944, when a sufficient amount of experience in handling electrical torpedoes had been accumulated.



A mine requires a great deal of attention.

When the Great Patriotic War broke out our fleet had in its arsenal mine-torpedo weapons which, so far as their characteristics were concerned, were as good as similar weapons in the arsenals of the world's leading states. The serial production of new models was mastered, and considerable stocks were amassed in the fleets, satisfying the needs of combat operations, despite the fact that at the beginning of the war the main mine and torpedo factories

were evacuated and they were then set up in new locations. The work of Soviet sailor-scientists, which generalized the experience of combat training during the pre-war years, and which developed the basic provisions for the tactics to be used with the mine-torpedo weapons, contributed to the successful use of weapons by VMF ships.

The Great Patriotic War was a serious test of all that had been done in the country to increase its defensive capabilities. The conditions under which mine-torpedo weapons were used changed in accordance with changes in the situations existing along the fronts and in the maritime theatres.

In the first two years of the war torpedoes were used mainly by submarines and PT boats. Fleet aviation had for its primary mission the land front, so made limited use of torpedoes. However, in 1943 naval aviation had already outstripped the submarines in the use of torpedoes, and was in the van.

Mines were used by all fleets, right from the beginning of the war. Mines were planted in defense of own bases, of ports, for covering the flanks of the land forces, and in the interests of anti-landing defense. Defensive mine fields were important elements of mine-artillery positions, and of defensive barriers across the approaches to bases and ports.

But as of the fall of 1942, submarines, PT boats, and surface warships did active mine laying, for the most part, the purpose of which was to disrupt the enemy's lines of communications (destroy cargo ships, surface warships, and submarines).

In all, from 1941 to 1945, as a result of the active use of mine-torpedo weapons, ships and aviation of the VMF destroyed and damaged over 1,000 combatant and merchant ships of the enemy.

The successes achieved were the result of the high degree of reliability of the mine-torpedo weapons, and the good training given personnel. Widely known in our country are such masters of torpedo attacks as F. A. VIDYAYEV, M. I. GADZHIYEV, M. V. GRESHILOV, P. D. GRISHCHENKO, V. P. GUMANENKO, Ya. K. IOSSELIANI, V. N. KISELEV, I. F. KUCHERENKO, N. A. LUNIN, A. I. MARINESKU, V. G. STARIKOV, I. V. TRAVKIN, I. I. FISANOVICH, A. O. SHABALIN, and others.

And long remembered will be many of the episodes from the combat operations of the submarines, such as the masterful attack made by S-101 under command of Captain Lieutenant Ye. N. TROFIMOV off Mys Zhelaniya, as a result of which the German submarine U-639 was sunk, or of the exploits of the minelayer L-3,



under command of P. D. GRISHCHENKO along the routes over which cargo ships moved in the Klaypeda region. A destroyer and two cargo ships were blown up and sunk by the mines laid by the submarine.

Experience in the use of mines and torpedoes obtained during the Great Patriotic War has served as the basis for further development of mine-torpedo weapons.

Even while the war was in progress specialists in the planning and fleet organizations had created completely new mines and torpedoes with much better characteristics. Within short periods of time aviation influence bottom mines and a large shipboard moored mine with an influence exploder had been designed, built, tested, and accepted into the arsenal. The fleets were given the fastest torpedo in the world during the war. The group of engineers which created the torpedo was awarded a State Prize.

Weapon development after the Great Patriotic War took the path of increasing the range and speed of torpedoes, increasing their accuracy and destructive effects, and developing influence exploders for both torpedoes and mines.

A great deal of attention in the first post-war years went to improving the electric torpedoes. Specific operational and production experience was accumulated in the course of developing and testing them. The talented design cadres, and highly qualified fleet specialists, have increased.

The basic tactical advantage of electric torpedoes is lack of a wake, low noise, and lack of effect of depth on running speed. This is particularly important for the design of homing torpedoes to fight not only surface combatant and cargo ships, but also submarines (regardless of submergence depth).

The destructive effect of torpedoes at this time can be increased so that it is virtually unlimited by using atomic warheads, while the effectiveness with which they are used in battle can be ensured by the use of homing systems impervious to interference, as well as by new fire control methods.

The revolution in military affairs which has resulted from the appearance of atomic power engineering has led to a reevaluation of the role the various types of forces play in destroying naval and land targets.

If, during the last war, the struggle with fleet forces was conducted primarily by aviation and surface warships, with the submarines the main force in actions along the lines of communications, today, with the appearance of atomic-powered submarines, the situation has changed substantially.

Atomic-powered submarines, fitted out with modern combat and technical equipment, are capable of striking not only the main fleet forces, but also of destroying land targets located long distances from the shores.

Simultaneously, the capability of atomic-powered submarines to destroy sea and ocean lines of communications has increased substantially. Modernization of submarines, and the increase in their role in combat operations at sea, have served as the impetus for the rapid development which has taken place in antisubmarine forces and equipment.

The strong antisubmarine defenses provided combatant ships and convoys have forced torpedo attacks to be made at long ranges and at great depths. This, in turn, results in the need to build deep-water homing torpedoes. And they have already made their appearance in the armament for the fleets.

Although homing torpedoes are now considered to be one of the most effective means for use in the struggle at sea, mines can still be used successfully in many instances to wage war against fleet forces.

Experience of past wars is convincing evidence that, in particular, mines can be used not only for the defense of naval bases, for covering important sections of the coast and preventing gun-carrying warships from striking from the sea and effecting landings, but also for blockading the enemy, disrupting sea lines of communications, and for combat activities of the fleet.

With the growth in the economic might of the Soviet state have come real conditions for equipping the fleet with the most modern of mine-torpedo weapons for various purposes.

The Leninist precepts with respect to strengthening the defensive capabilities of the country becoming reality, our Party is displaying constant concern for increasing the combat readiness of the Armed Forces so they will be ready to shatter and repulse the imperialist aggressor at any time.

Preparing to meet the 50th anniversary of Soviet power, our engineers and scientists are persistent in their efforts to create new models of mine-torpedo weapons which will respond to the highest demands of today.

The Soviet sailors persistently study and maintain their terrible weapons in constant readiness for striking the enemy.